

What is claimed:

1. A therapeutic composition comprising:
a biodegradable carrier, said carrier comprising a first polysaccharide
5 cross-linked to a second polysaccharide, wherein said first and second polysaccharides is
each a member selected from the group consisting of hyaluronic acid, dextran, dextran
sulfate, chondroitin sulfate, dermatan sulfate, keratan sulfate, heparin, heparan sulfate and
alginate; and wherein said first and second polysaccharides are covalently cross-linked to
each other through imine bonds between amino groups on said second polysaccharide
10 and aldehyde groups from oxidized sugar rings on said first polysaccharide; and
a therapeutic agent selected from the group consisting of growth factors,
cytokines, hormones, DNA constructs, and autologous, allogenic or modified cells.
2. The composition of claim 1, wherein said first polysaccharide is the same
15 as said second polysaccharide.
3. The composition of claim 2, wherein said first and said second
polysaccharide are both hyaluronate.
- 20 4. The composition of claim 1, wherein said first polysaccharide is different
from said second polysaccharide.
- 25 5. The composition of claim 4, wherein said first polysaccharide is
hyaluronate and said second polysaccharide is chondroitin sulfate.
6. The composition of claim 1, wherein said first polysaccharide contains an
excess of aldehyde groups such that free aldehyde groups remain subsequent to cross-
linking to said second polysaccharide.

7. The composition of claim 1, wherein said carrier has a gel-like form.
8. The composition of claim 1, wherein said carrier has a sponge-like form.

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9. The composition of claim 1, wherein said therapeutic agent is covalently bonded to said carrier.

10. The composition of claim 1, wherein said therapeutic agent is entrapped within said carrier.

11. The composition of claim 1, wherein said therapeutic agent is a chondrogenic agent.

- 15 12. A method of inducing cartilage growth in vivo, comprising a step of administering a composition of claim 1 at a site of desired cartilage growth.

13. A method of conducting cartilage growth in vivo, comprising a step of administering a composition of claim 1 at a site of desired cartilage growth.

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14. A therapeutic composition for supporting cartilage repair, comprising:
a biodegradable carrier, said carrier comprising a first polysaccharide cross-linked to a second polysaccharide, wherein said first and second polysaccharides is each a member selected from the group consisting of hyaluronic acid, dextran, dextran sulfate, chondroitin sulfate, dermatan sulfate, keratan sulfate, heparin, heparan sulfate and alginate; and wherein said first and second polysaccharides are covalently cross-linked to each other through oxime bonds between amino groups on said second polysaccharide and aldehyde groups from oxidized sugar rings on said first polysaccharide;

a therapeutic agent supported by the carrier, the therapeutic agent being selected from the group consisting of growth factors, cytokines, hormones, DNA constructs, and autologous, allogenic or modified cells; and
a population of cells seeded on or into the carrier.

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15. The composition of claim 14, wherein said therapeutic agent is covalently bonded to said carrier.

10 16. The composition of claim 14, wherein said therapeutic agent is entrapped within said carrier.

17. The composition of claim 14, wherein said therapeutic agent is a chondrogenic agent.

15 18. The composition of claim 14, wherein said seed cells are chondrocytes.

19. A method of inducing cartilage growth in vivo, comprising a step of implanting a composition of claim 14 at a site of desired cartilage growth.

20 20. A method of conducting cartilage growth in vivo, comprising a step of implanting a composition of claim 14 at a site of desired cartilage growth.

21. A method for preparing a biodegradable device for cartilage repair, said method comprising:

25 preparing a carrier by reacting a first polysaccharide derivative having aldehyde groups with a second polysaccharide under conditions whereby said aldehyde groups covalently react to cross link with said second polysaccharide to form said carrier and wherein said first and said second polysaccharides are independently selected from

the group consisting of hyaluronic acid, dextran, dextran sulfate, chondroitin sulfate, dermatan sulfate, keratan sulfate, heparin, heparan sulfate and alginate;

introducing a therapeutic agent into or onto the carrier, the therapeutic agent being selected from the group consisting of growth factors, cytokines, hormones,

5 DNA constructs, and autologous, allogenic or modified cells; and

seeding a population of cell on or into the carrier.

22. The method in claim 21, wherein introducing the therapeutic agent includes mixing the therapeutic agent with the first polysaccharide derivative or the 10 second polysaccharide derivative before reacting the first polysaccharide derivative with the second polysaccharide derivative, such that reacting the first polysaccharide derivative with the second polysaccharide derivative entraps the therapeutic agent within the carrier.

15 23. The method in claim 21, wherein introducing the therapeutic agent includes mixing the therapeutic agent with the carrier, such that the therapeutic agent is entrapped within the carrier.

24. The method in claim 21, wherein introducing the therapeutic agent 20 includes reacting the therapeutic agent with the first polysaccharide derivative or the second polysaccharide derivative before reacting the first polysaccharide derivative with the second polysaccharide derivative.

25 25. The method in claim 21, wherein the seeded cells are chondrocytes.

26. The method in claim 21, wherein the seeded cells are cultured in the 25 carrier.

27. The method in claim 21, wherein the therapeutic agent is a chondrogenic agent.

28. A method of supporting cartilage repair in vivo, said method comprising:
5 preparing a biodegradable carrier by reacting a first polysaccharide derivative having aldehyde groups with a second polysaccharide under conditions whereby said aldehyde groups covalently react to cross link with said second polysaccharide to form said carrier and wherein said first and said second polysaccharides are independently selected from the group consisting of hyaluronic acid,
10 dextran, dextran sulfate, chondroitin sulfate, dermatan sulfate, keratan sulfate, heparin, heparan sulfate and alginate;
introducing a therapeutic agent into or onto the carrier, the therapeutic agent being selected from the group consisting of growth factors, cytokines, hormones, DNA constructs, and autologous, allogenic or modified cells;
15 seeding a population of cells on or into the carrier; and
implanting the carrier at a site of desired cartilage repair.